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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,905	01/31/2007	Matthew Gibson Field	7101P005	4593

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EXAMINER	
MAWARI, REDHWAN K	

ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,905	FIELD ET AL.	
	Examiner	Art Unit	
	REDHWAN MAWARI	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *5 and 17-42* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-16 and 43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This Office Action is responsive to Applicant's amendment and request for reconsideration of application 10/550,905 filed on August 27, 2009.

Applicant's request for reconsideration of the 112 2nd of the rejection of the last Office action is persuasive and, therefore, the 112 2nd of that action is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6, 8-16 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenwood (5,521,819) in view of Nobutaka (EP 0 925 992 A2) and further in view of Henry (4,680,959).

Consider claim 1, Greenwood discloses a method of controlling a continuously variable ratio transmission of the type comprising a continuously variable ratio unit ("variator") which has rotary input and output members through which the variator is coupled between an engine and a driven component (see at least col., lines 18-23, see at least FIG. 1), the variator receiving a primary

control signal and being constructed and arranged to exert upon its input and output members torques which, for a given variator drive ratio (see at least col. 8, lines 18-35, and FIG. 1), correspond directly to the control signal, the method comprising:

determining a target engine acceleration (see at least col. 3, lines 22-28),

determining settings of the variator's primary control signal and of an engine torque control for providing the target engine acceleration and adjusting the variator's primary control signal or the engine torque control based on these settings (see at least col.3, lines 29-47, col. 3, lines 49-67); for more clarification the examiner introduces a secondary reference to show engine speed change based on comparison of the actual versus the predicted signals;

Nobutaka teaches predicting a consequent engine speed change ([see at least paragraph 0067]), and

correcting the settings of the control signal and engine torque based on a comparison of actual and predicted engine speeds ([see at least paragraph 0067-0069]). Furthermore, the examiner introduces a secondary reference; Greenwood in view of Nobutaka do not explicitly disclose integration of real time to provide the predicted speed values;

Henry teaches predicting the engine speed change using the integration of in real time to provide the predicted speed values (see at least Henry abstract);

Henry teaches predicting the engine speed change resulting from the adjusting the variator's primary control signal or the engine torque control (see at least col. 2, lines 3-29);

Greenwood discloses the excess torque output is shared between accelerating the engine (see at least col. 2, lines 65-67), also, (col. 3, lines 1-3), Greenwood discloses when torque TE and TE' are equal, engine speed remain constant. Furthermore, in (col. 3, liens 15-28),Greenwood discloses, when the engine torque varies, the torque excess will start to accelerate the engine from speed NA at point A to the desired new speed NB at point B. Furthermore, Henry discloses predicting an engine speed based on the engine acceleration, i.e. for compensation of measured engine torque for engine acceleration (see col. 4, lines 33-44).

Accordingly, it would have been obvious to an ordinary skilled person in the art to incorporate the invention of Henry into the invention of Greenwood in view of Nobutaka for the purpose of enhancing the accuracy of the overall system.

Consider claim 2, Greenwood in view of Nobutaka and Henry disclose wherein engine characteristics are included in predicting engine speed change ([see at least Nobutaka, paragraph 0067-0069]). Fore more clarification see Henry abstract, wherein the predicted engine speeds values are based on integration).

Consider claim 3, Greenwood in view of Nobutaka and Henry disclose calculating the instantaneous torque expected to be created by the engine and using the calculated torque value in predicting the engine speed change (see at least Henry, abstract).

Consider claim 4, Greenwood in view of Nobutaka and Henry disclose wherein transmission characteristics are included in predicting the engine speed change (see at least Henry, abstract).

Consider claim 6, Greenwood in view of Nobutaka and Henry disclose wherein the construction and arrangement of the variator is such that the sum of the torques exerted by the variator upon its rotary input and output members is always proportional to magnitude of the primary control signal (see at least Greenwood, col. 2, lines 44-50, col. 2, lines 61-67, and col. 3, lines 1-3).

Consider claim 8, Greenwood in view of Nobutaka and Henry disclose wherein the target engine acceleration is calculated based on a difference between current and target engine speeds (see at least Greenwood, col. 3, lines 22-28)

Consider claim 9, Greenwood in view of Nobutaka and Henry disclose wherein target engine speed is set in dependence upon a user input (see at least Greenwood, col. 3, lines 14-28).

Consider claim 10, Greenwood in view of Nobutaka and Henry disclose wherein the user input is interpreted as a demand for a transmission output torque and engine speed (see at least Greenwood, col. 3, lines 14-28).

Consider claim11, Greenwood in view of Nobutaka and Henry disclose wherein the driver's demands for transmission output torque and engine speed are modified based on engine efficiency considerations (see at least Greenwood, col. 3, lines 14-28).

Consider claim 12, Greenwood in view of Nobutaka and Henry disclose wherein the demanded transmission output torque is converted to a target engine torque using a model of the transmission characteristics (see at least Greenwood, col. 3, lines 14-28, col. 3, lines 49-67 and col. 4, lines 1-5)

Consider claim 13, Greenwood in view of Nobutaka and Henry disclose wherein, subject to limitations of the engine, a torque request to the engine torque controller is set to the sum of the target engine torque and the excess torque TrqAcc required to accelerate power train inertia ([see at least paragraph 0018]).

Consider claim 14, Greenwood in view of Nobutaka and Henry disclose wherein the engine's response to the torque controller is modelled to provide an estimate of instantaneous engine torque (see at least Greenwood, abstract).

Consider claim 15, Greenwood in view of Nobutaka and Henry disclose wherein the excess torque TrqAcc required to accelerate the engine is subtracted from the estimated instantaneous engine torque to obtain a required loading torque to be applied by the transmission to the engine, the variator control signal being adjusted to provide the required loading torque (see at least Greenwood, col. 4, lines 26-33).

Consider claim 16, Greenwood in view of Nobutaka and Henry disclose wherein instantaneous values of engine torque and of loading torque applied to the engine by the transmission are estimated and used to calculate engine acceleration, the engine acceleration being integrated with respect to time to provide a prediction of engine speed, and closed loop control being applied to engine speed to correct it toward the predicted value (see at least Henry, abstract).

Consider claim 43, Greenwood in view of Nobutaka and Henry disclose wherein the feedback method involves preferentially adjusting the transmission settings to control the engine speed error (see at least Greenwood abstract)

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greewood (5,521,819) in view of Nobutaka (EP 0 925 992 A2) and further in view of Henry (4,680,595) and Danz (6,418,366).

Consider claim 7, Greenwood in view of Nobutaka and Henry do not explicitly disclose two hydraulic pressures;

Danz discloses wherein the control signal takes the form of a difference between two hydraulic pressures (see at least col. 3, lines 14-30, wherein the control signal is taking the form of the difference between P1 and P2).

Accordingly, it would have been obvious to an ordinary skilled person in the art to incorporate the invention of Danz into the invention of Green in view of Nobutaka and Henry for the purpose of improving the accuracy of a continuous variable transmission.

Response to Arguments

Applicant's arguments have been fully considered but are not persuasive. In particular the applicant argues:

A) Greenwood describes a method of controlling a continuously variable ratio transmission including a variator. Nobutaka, however, is concerned with the control of a different type of transmission that teaches away from Greenwood and the subject matter of the present application. Greenwood describes a torque-controlled transmission. Nobutaka describes a ratio-controlled transmission. The two types of transmissions work in very different ways.

Nobutaka describes choosing a target transmission ratio based upon a target engine speed and using a mathematical delay function to adjust the transmission along a controlled path. (see Nobutaka paragraphs [0069]-[0092]). The "inertia torque" can be calculated and the engine setting can be modified so that the application of this inertia torque does not create unwanted deviations in the torque experienced by the driver. Such a process is not carried out with a torque-controlled transmission and is dissimilar

from the present application. The control system of the present application does not, in the direct way contemplated by Nobutaka, impose a profile upon changes in transmission ratio. Instead, as described above, a torque-controlled transmission, as described in Greenwood and in the present application, depends upon the management of the dynamic balance of engine torque and loading torque at the engine-transmission interface.

B) The Examiner alleges that Greenwood discloses "determining a target engine acceleration" at least at col. 3, lines 22-28 and "determining settings of the variator's primary control signal and of an engine torque control for providing the target engine acceleration" and "adjusting the variator's primary control signal or the engine torque control based on these settings" at least at col. 3, lines 29-67. (Office Action dated 4/28/09, page 4). Applicants respectfully disagree. Greenwood describes a change in engine output torque that will cause the engine to accelerate from one speed to a desired new speed. Greenwood's description is focused on a desired speed, not the determination of a target engine acceleration. Similarly, Nobutaka describes an operator signal from the accelerator pedal being input into a "target speed generator." (Nobutaka, paragraph [0069]) (emphasis added). Henry describes a desired (simulated) engine speed, not a target engine acceleration. The combination is focused on adjustments based upon a chosen engine speed target, not determining a target engine acceleration, determining settings of the variator's primary control signal and of an engine torque control for providing the target engine

C) Furthermore, applicants submit that the references fail to disclose predicting a consequent engine speed change resulting from the adjusting the variator's primary control signal or the engine torque control, and correcting the settings of the variator's primary control signal and engine torque based on a comparison of actual and predicted engine speeds. Greenwood describes comparing instantaneous values of actual engine speed with a desired engine speed, but is silent regarding a prediction of engine speed change resulting from adjusting variator and engine torque controls based upon the target acceleration. The Examiner relies upon Nobutaka paragraphs [0067]-[0069] in the allegation of obviousness. Applicants respectfully submit that Nobutaka is focused on using an actual engine speed and a power request command to generate a throttle position command. Additionally, Nobutaka describes inputting an operator signal form the accelerator pedal and a measure of an actual vehicle speed into a target speed generator. Nobutaka does not describe predicting an engine speed change resulting from adjusting variator and engine torque controls based upon the target acceleration. Henry describes predicting a simulated engine speed - i.e., Henry computes an engine speed that would occur if the engine were connected to a drive train and vehicle. Henry, however, deals with a dynamometer in a test environment that simulates a conventional automatic transmission and does not disclose a prediction of engine speed change resulting from adjusting variator and engine torque controls based upon the target acceleration.

In response to applicant's argument A), that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been extremely advantageous to combine the prior art of record for the purposes of Improving a driveline and in particular to operate the control system when the driver's demand changes so as to effect a smooth and rapid change from one steady state according to the operative engine map to another when demanded by the operator. Both two references as well as the clamed invention are directed to a control system of drivelines including a continuously variable ratio transmission. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., different types transmissions) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to B) examiner respectively disagrees. Applicant is reminded that claims must be given their broadest reasonable interpretation. Given the broadest interpretation, as claimed it is the examiner's position, the reference of record teaches what he is argued. Greenwooed discloses varying engine speed changes with respect

to the torque (see at least col. 3, lines 30-47), wherein the torque is available to accelerate the engine (see at least col. 3, lines 50-57). Furthermore, the torque starts accelerating the engine speed from point NA to the desired new speed NB (see at least col. 4, lines 20-28). Desired engine speed is construed as target engine speed, and by accelerating the engine speed from one point to another, that is construed as determining an engine speed. Again, applicant argues features that are not claimed.

In response to C) examiner respectively disagrees. Applicant is reminded that claims must be given their broadest reasonable interpretation. Given the broadest interpretation, as claimed it is the examiner's position, the reference of record teaches what he is argued. First of all, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., prediction of engine speed change resulting from adjusting variator and engine torque controls based upon the target acceleration) are not recited in the rejected claim(s). The claim recites ONLY "the adjusting variator and engine torque control". Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, Greenwood discloses the excess torque output is shared between accelerating the engine (see at least col. 2, lines 65-67), also, (col. 3, lines 1-3), Greenwood discloses when torque TE and TE' are equal, engine speed remain constant. Furthermore, in (col. 3, liens 15-28),Greenwood discloses, when the engine torque varies, the torque excess will start to accelerate the engine from speed NA at point A to the desired new speed NB at point B. Furthermore,

Henry discloses predicting an engine speed based on the engine acceleration, i.e. for compensation of measured engine torque for engine acceleration (see col. 4, lines 33-44).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Redhwan Mawari whose telephone number is 571 270 1535. The examiner can normally be reached on 7:30 AM - 5PM Mon-Fri Eastern Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reaches at 571-272 6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tuan C To/
Primary Examiner
March 13, 2010